DISCUSSION

ROBERT A. PEERS, M.D. (Colfax).—Someone has said, "It was a brave man who first ate an oyster." It was a braver man who first performed extrapleural thoracoplasty for the closure of cavities resistant to pneumothorax or other measures. That thoracoplasty has survived, and has become a recognized and important method of treatment where pneumothorax and other measures fail, is due, perhaps, as much to good fortune as to skillful surgery. Fortunately, in spite of what we know now to have been insufficient removal of the proper constituents of the lung cage and what we realize was, at the time, too extensive surgery in the removal of parts of too many ribs, enough patients recovered from the shock of operation and a sufficient percentage recovered their health to encourage surgeons to improve their technique and their surgical judgment. Had the mortality been higher and the percentage of recoveries smaller, what is now a very valuable adjunct to antituberculosis treatment might have been lost forever or at least postponed for a long period. Herein, as noted, fortune played a hand.

Experience showed that what often was needed was a multistage operation instead of a shock-producing one-stage attack. Experience also showed that the removal completely of a few of the upper ribs, together with the transverse processes, together with partial removal of two or more lower ribs, would result in success where failure was common when parts of many more ribs were removed. Doctors Holman and Pierson have explained why this is so. They have still further improved on the method by removal of part of the scapula where conditions indicate the advisability of this measure. As the authors have pointed out, the plan of attack as outlined by them enables them to save much useful healthy pulmonary tissue.

The author of this discussion can, from personal experience, heartily endorse all that has been said by Doctors Holman and Pierson. With carefully selected cases, operated on as outlined with individual surgical resources adapted to individual cases, we now have in thoracoplasty a means of saving many lives which were hopelessly doomed before the advent of this additional procedure of thoracic surgery.

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HANS SCHIFFBAUER, M.D. (520 West Seventh Street, Los Angeles).—I quite agree with the contents of Doctor Holman's paper. More ill-advised and inadequate thoracoplasty operations are being done than ever before, and many of these patients will have residual cavities which produce positive sputum.

Many surgeons have felt that when a complete posterior thoracoplasty has been supplemented by some form of anterolateral resection of the remaining sections of ribs with their costal cartilage, and after months of careful sanatorium treatment, a cavity still persists with a positive sputum, nothing more can be done.

Doctor Holman has beautifully shown that these cases can be successfully reoperated, removing the bony plate with the transverse process over the existing cavity in the diseased lung, producing complete obliteration of the existing cavity.

After the removal of the transverse processes there is a greater tendency to scoliosis, especially in children. So, instead of removing the transverse processes, I have disarticulated the neck of the ribs from the transverse process, also disarticulated the head from the vertebrae with its periosteum, and using caution not to leave more than a minimum of denuded bone in the operated field. After three to five such stumps are removed, with sharp and blunt dissection, the parietal pleura can be separated from the lateral vertebral column, which allows the diseased lung to shrink up, leaving the transverse processes undisturbed.

Doctor Holman brought out the necessity of removal of the lower portion of the scapula. This is very necessary in partial selective thoracoplasty where larger sections of the sixth and seventh rib are not removed. At times it may be advisable to remove six to eight centimeters of the entire vertebral border of the scapula in order not to have the scapula interfere with adequate collapse over the operated area.

In all of the more recent thoracoplasty after section of the rib at transverse process, I remove the neck and head by disarticulation with its periosteum, beginning with the third rib. I am certain, in so doing, that I have obtained greater collapse of the diseased lung without damaging the transverse process, which is an advantage to the patient.

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F. M. POTTENGER, M.D. (Pottenger Sanatorium, Monrovia).—In recent years surgery of the chest has developed quite rapidly. It has offered hope to a certain group of patients who could not possibly have gotten well without it.

While the healing of tuberculosis is brought about through the patient's own physiologic reactions, the mechanical conditions must be favorable or such healing cannot occur. Loss of tissue causes shrinking of the lung volume, and unless the remaining portion of pulmonary tissue is able to enlarge and fill in the thoracic cage, cavity walls remain apart, tension is put upon the pulmonary structures, and healing is interfered with.

The proper form of chest surgery suited to the individual case acts by improving the mechanical condition, thus allowing physiologic healing to take place.

One of the problems which has baffled clinicians since attempts were first made to treat tuberculosis has been the apical cavity. While now and then such a cavity would epithelize and become dry, as a rule it continues suppurating as long as the patient lives and frequently is the focus from which the disease spreads to other parts of the lung. Operation of such cavities in the past have not been very successful in bringing about closure. Doctors Holman and Pierson discuss in a very satisfactory manner certain reasons for this failure.

Inasmuch as surgery alone offers hope for the patient suffering from a large apical cavity, clinicians have been free to recommend them for surgery, only to be disappointed in the result obtained.

The authors discuss two measures which will make this operation more satisfactory: first, the resection of the transverse processes of the second, third, fourth, fifth, and possibly sixth vertebrae, depending upon the size of the cavity; and second, the resection of the lower third of the scapula, so as to allow the chest wall to fall in and complete the approximation of the cavity walls.

While it is very fortunate that patients with tuberculosis should, in such large numbers, be permitted to go on to the formation of large apical cavities, it is gratifying that surgeons are able to devise a technique which offers them hope of relief.

ABDOMINAL HERNIAS*

THE USE OF AUTOGENOUS STRIPS OF FASCIA LATA IN THE REPAIR OF THE MORE DIFFICULT ABDOMINAL HERNIAS

By DONALD C. COLLINS, M.D.
Los Angeles

DISCUSSION *by Hall G. Holder, M.D., San Diego; C. Latimer Callander, M.D., San Francisco; E. Eric Larson, M.D., Los Angeles.*

FOR clinical purposes, abdominal hernias may be grouped into two classes: First, those of a simple character in which a very large number of cures result from operative measures; and, second, that smaller group where ordinary standard surgical procedures usually lead to failure and recurrence. Members of this second group are: direct inguinal, sliding, postoperative, diaphragmatic, recurrent, and the large indirect inguinal hernias—so frequently observed in the elderly, debilitated patient.

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In this second group surgeons have recognized these facts. They have used various kinds of non-absorbable sutures as various types of wire, linen, silk, and silkworm gut. Of the absorbable materials employed, catgut and ox or kangaroo tendon are still the most popular sutures. The enthusiastic advocation of multiple techniques and suture materials to be used in a successful hernioplasty is sufficient proof of the inadequacy of present methods of repair. We are seeing an increasingly greater number of unsuccessful attempts at cure in this group by the injection of various sclerosing solutions in the vain hope of closing the hernial defect by the formation of inflammatory scar tissue.

AUTOPLASTIC SUTURES

Lewis Linn McArthur,[7] in 1904, published his final report on the use of autoplastic sutures in the repair of hernia and other diastases. This was a report of the use, in his clinic, since the year 1896, of autoplastic strips of the external oblique aponeurosis instead of foreign suture material in inguinal hernioplasties.[9] Few surgeons paid much attention to McArthur's method, or to the underlying principles of the use of autoplastic fibrous tissue in the place of absorbable foreign sutures. Subsequent reports in the surgical literature upon the use of McArthur's technique have shown excellent results, with a negligible percentage of recurrences. Postmortems done on individuals who had had such a repair done previously, and then had later died from causes unrelated to their hernioplasty, demonstrate that the transplanted sutures of aponeurosis had lived and were firmly united to the tissues through which they passed. Active proliferation of connective tissue could be seen originating from such sutures. Dr. C. W. Mayo[8] in recent years has successfully used this method in the cure of inguinal hernias. In hundreds of his patients that have now been followed for two or more years, there has been less than one-half of one per cent of recurrence.

LIVING AUTOGENOUS STRIPS OF FASCIA LATA

Between the years of 1921 to 1930, Gallie and LeMesurier[2,3,4,5] firmly established the value of living autogenous strips of fascia lata derived from the individual patient. They have popularized the use of this material not only in inguinal hernias, but also in the largest and most difficult varieties of this second group. These authors conclusively demonstrated that either pedunculated or free strips of fascia lata will continue to live indefinitely so long as they are able to receive an adequate supply of lymph and tissue plasma. The tensile strength of fascia lata has been estimated to be 750 pounds in a straight pull before rupture will occur. This, of course, far exceeds the tensile strength of any absorbable foreign suture that we may employ. They also found that this amazing tensile strength was unchanged and was not lost in the free transplanted strips of the patient's own fascia lata. However, this method had a major objection to its universal use by surgeons, because it necessitated the making of a long incision along the lateral surface of the thigh so that the tendon of the tensor fascia lata muscle could be exposed, from which the fascia lata strips could be obtained. This difficulty was removed by the perfection of a fascia lata stripper by Dr. J. C. Masson,[10] during the year 1933. In 1935, Masson[11,12] did much to popularize this method of treating these more difficult abdominal hernias by the presentation of two timely articles, which were widely read by the surgical profession.

REPORT ON HERNIAS AMONG STEEL WORKERS

The recent report of Foster[1] on 101 unselected cases of hernias occurring among steel-mill workers, in which autogenous sutures of fascia lata was used, is of great interest. His patients returned to full duty within six months following their hernioplasty. Many of these individuals were elderly, possessing atrophic tissues together with huge hernias. The end-results proved to be far superior to former methods employed. In only two of the seven recurrences was faulty operative technique to blame. Most important of all, these seven were again repaired with additional strips of autogenous fascia lata, and they have had no further recurrences.

MASSON FASCIA LATA STRIPPER

The Masson fascia lata stripper consists of two steel tubes that telescope one over the other. The outer tube is shorter and has a knife edge on its distal end. The inner tube forms the handle of the instrument and has an eyelet at its distal end. The outside tube is threaded at its upper end so that it can be screwed onto the inner tube just below the handle. With the instrument thus assembled, the cutting-knife edge is well above the eyelet of the inner tube and can do no damage to neighboring tissues. The skin of the lateral aspect of the thigh, over the proximal portion of the tendon of the tensor fascia lata muscle is incised for a distance of 5 centimeters, and the tendinous portion is exposed. A strip is then dissected out of the tendon, about 2 centimeters in width, and then the strip is lengthened for a distance of 5 centimeters. Then the fascia strip is threaded through the eyelet of the stripper and securely grasped by several hemostats. The stripper is forced down the thigh until it lodges in the neighborhood of the external condyle of the femur. The outer tube is then unscrewed and, with several twisting motions, the knife-edge cuts off a strip of fascia lata the length of the subcutaneous extent of the stripper. Additional strips can easily be obtained in a similar manner. These strips are then split longitudinally in the direction of their fibers, into narrower strips of about half a centimeter in width. The individual strips thus obtained are threaded onto thick, heavy short needles that are securely tied on by ligatures of black silk. The other end of the strip is also securely tied by a similar ligature. After taking the first two stitches, the needle is passed back through the strip close to its ligated end, thus forming a slip-knot which will firmly secure it. Fascia lata can only be fastened in this manner because of its inability to remain tied in a square knot. After this

first strip has been used up, another is similarly prepared and fastened to the first strip by a similar use of a slip-knot. The needle is removed from the first strip, making certain that a secure ligature of black silk has been tied there to prevent the fraying out of the end of the strip. Thus, each strip is fastened onto the preceding one for the purposes of security. As additional measures of security, the sutures are allowed to pass through one another as a basket-weave suture wherever possible. The last suture is ended by suturing the free end down with black silk to neighboring strong tissues and doubly tying it there. Chromic catgut has been found unsatisfactory as ligature material and will easily slip off of the fascia strips, thus endangering the entire hernioplasty.

OTHER PROCEDURES

One can usually obtain enough fascia lata strips from one thigh to repair even the largest of hernias. These hernial defects are closed without tension. If the edges cannot be reapproximated with ease, then the defect is closed by weaving in a basket-weave closure of strips. The resultant defect in the tensor fascia lata muscle causes no discomfort, but I warn my patients that such a muscle hernia will follow their hernioplasty, but that it is of no consequence. Most surgeons make the mistake of attempting to obtain fascia lata from the more anterior and medial portions of the thigh, with the usually dismal failure as their reward. It is only in the fibers of the tendon of the tensor fascia lata muscle that the fascia lata can be easily stripped off for any appreciable distance, and done safely. The thigh incision is closed tightly in layers with the use of one retention-suture of silkworm gut for supportive measures, as the thigh receives considerable active motion in bed postoperatively. All of my hernioplasties remain in bed for at least three weeks or longer, depending on the character of their postoperative convalescence. All hernioplasty incisions are drained dependently for the first seventy-two hours following surgery, in an effort to prevent the formation of incisional hematomas or the collections of serum which do so much toward lengthening the postoperative convalescence of your patient. Every effort is made to prevent the formation of dead spaces in the incision. I pay very little attention to whether the patient is obese, because, with the use of living sutures, the problem of excessive intra-abdominal pressure tearing down the hernioplasty can be disregarded, since you are suturing structures with a suture that has a tensile strength of 750 pounds to the square inch of pull. As a consequence, bites with the fascia needle are deeper and include more tissue than would be done if foreign sutures were used. No particular effort is made to clean off the adipose tissue from muscles or fascial structures before suturing them together, inasmuch we are dealing with a living suture which, as time goes on, will become increasingly stronger and will actually proliferate fibrous tissues from its fibers. The obtaining of the fascia lata strips and the resuture of the thigh incision should not take more than five to seven minutes to complete, when the Masson fascia lata stripper is employed. All of my patients wear an adequate Scultetus abdominal binder while in bed and an efficient abdominal supportive belt for one year following their dismissal from the hospital. Whenever possible, I insist on the use of a spinal anesthesia to obviate abdominal straining and to insure maximum relaxation of the abdominal wall.

INDIRECT INGUINAL HERNIAS

I have been using a modified McArthur technique in the surgical treatment of indirect inguinal hernias, with one recurrence, so far, in a group of eighty-three patients so treated, and followed for at least two years since the time of their operation. After the reduction of the hernial contents and a high ligation of the hernial sac with its transposition up behind the conjoined tendon, two strips of external oblique aponeurosis one centimeter in width are cut. One strip is left attached to the spine of the pubis while the other is left attached to the cephalic end of the external oblique muscle. A modified Bassini hernioplasty is then done, using these two strips of aponeurosis as running mattress sutures to close the inguinal canal, by suturing the conjoined tendon down to Poupart's ligament and particularly strengthening the internal ring. The external oblique is also sutured beneath the cord for additional strength. If the conjoined tendon is found to be weak and of little value in the lower portion of the inguinal canal, strips of autogenous fascia lata are taken and the resultant defect is filled by a basket-weave type of suture that very easily closes the opening without tension.

VENTRAL OR INCISIONAL POSTOPERATIVE HERNIAS

In instances of ventral or incisional postoperative hernias, particular attention is paid to overlapping the edges of the hernial opening. Often valuable tissue can be salvaged from the hernial walls for this purpose. This scar tissue is sutured to the muscle tissue of the opposite side, and vice versa. Thus, a double layer of tissue is first used in the preliminary closure of the peritoneal cavity, which is secured by ordinary absorbable sutures. To prevent the recurrence of the hernia following some sudden increase of intra-abdominal pressure, such as may follow coughing, sneezing, or straining at stool, additional support is provided by the use of autogenous fascia lata sutures either as mattress sutures or in the form of a basket-weave to strengthen the former hernial site. These sutures take bites into the imbricated repair and deep bites out into neighboring normal tissues. Never should an attempt be made to draw muscles together under excessive pressure, as this will only lead to eventual necrosis of the sutured muscle and the repair will break down due to faulty operative technique, and not due to any fault of the fascia sutures. Interrupted mattress retention sutures of silkworm gut are used to obliterate dead spaces in the incision, and thus discourage hematoma formation or the collections of serum which may lead to secondary wound infections. If such a complication does

occur, the fascia repair will usually hold, but the incision will not heal until all of the silk knots have been removed. Thus, particular care is taken to have the preoperative preparation as thorough as possible, which includes a sterile preparation of the skin of the operative site the day preceding surgery. Interestingly, most of these patients show a fever of only 99.0 or 99.5 degrees Fahrenheit for the first two days postoperatively. Postoperative morbidity and complications are far less when autoplastic fascia sutures are used.

UMBILICAL HERNIAS

In umbilical hernias the hernial opening is enlarged to expose the edges of the recti muscles. The Mayo overlapping closure is performed, suturing the cleaned peritoneal portion of the upper flap to the anterior rectus sheaths of the lower flap, using forty-day chromic catgut. The imbrications are further strengthened by the use of autogenous fascia lata sutures. Interrupted retention sutures of silkworm gut are used to obliterate dead spaces in the incision. The superficial portions of the incision are closed by layers. The dependent portion of the incision is drained for the first seventy-two hours following operation.

FEMORAL HERNIAS

In femoral hernias in which there is a large femoral canal, I use strips of fascia lata to firmly close the hernial defect. Following the reduction of the hernia and the high ligation of the sac, the femoral canal is blocked by mattress fascia lata sutures taken through the upper portion of the pectineus muscle and thence passed up the canal and through the external oblique just cephalad to Poupart's ligament. This simple procedure works very well and is quickly done. In five cases so treated there have been no recurrences to date.

DIAPHRAGMATIC HERNIAS

In large diaphragmatic hernias the defect is first closed by overlapping the margins of the hernial opening for a distance of 3 centimeters by the use of interrupted mattress sutures of linen. This suture line is then further strengthened by running mattress sutures of autogenous fascia lata strips. This makes the strongest possible closure obtainable. If there has been considerable loss of diaphragmatic muscle or its attachment to the thoracic wall has been torn, fascia lata strips are invaluable and will give a strong permanent closure.[6]

REPORT ON FORTY-FOUR CASES

I wish to briefly report my experiences with forty-four patients in whom the Masson-Gallie technique was closely followed, using autoplastic fascia lata strips. There were no deaths either in the hospital nor during their convalescence. Twenty-six were males. In only one individual is there some doubt as to whether there might be a newly developed weakness in the inguinal region lateral to the site of the repair of a huge postoperative ventral hernia following the removal and drainage of a gangrenous perforated appendix. The hernia of this patient was repaired less than one year following the appendectomy, and promptly developed an acute wound infection in a supposedly clean case. The thigh incisions healed *per primum*. It is highly probable that latent infection existed in the tissues of the anterior abdominal wall from the first operation. It was necessary, in this instance, to secondarily open the incision superficially and remove all the silk knots. This was followed by prompt healing of the incision. Four individuals had gangrenous incarcerated ventral incisional hernias in which portions of the small intestine, varying from 16 to 74 centimeters, were resected. Gastro-intestinal continuity was restored by the performance of aseptic end-to-end anastomoses, without a fatality. In eight instances the fascia repair was done in the presence of gross contamination, and all of these hernioplasties have held and are well healed today. There was only one wound infection in a supposedly clean case in this series, and the details of that case are given above. Table 1 summarizes the data of this group of patients and records the salient facts.

IN CONCLUSION

1. The use of autogenous fascia lata sutures has given a higher percentage of cures in the more difficult types of abdominal hernias than was formerly possible.

2. The Masson fascia stripper affords an easy and rapid means of obtaining an adequate supply of fascia lata without resorting to large incisions in the thigh.

3. Spinal anesthesia is the anesthesia of choice in these cases.

4. Obesity is no longer a contraindication to a prompt hernioplasty.

5. Forty-four cases of the more difficult types of abdominal hernias are reported in which the Masson-Gallie technique was closely followed. There were no deaths and only one questionable slight recurrence.

6. Eighty-three additional cases are included of indirect inguinal hernia in which the McArthur technique was followed. There was one recurrence. There were no deaths.

TABLE 1.—*Summary on Report of Forty-four Patients: Masson-Gallie Technique*

Number of patients reported upon	44
Sex:	
Males	26
Females	18
Deaths	None
Recurrences (questionable)	1
Clean cases	36
a. Wound infections	1
Dirty cases	8
a. Secondary operations to remove silk knots	3
Obese individuals	31
Age:	
a. Average age	47.8 years
b. Youngest individual	38 years
c. Oldest individual	71 years
Average number of fascia lata strips used per patient	5.2
Average time per operation (minutes)	98
Anesthetics used:	
a. Spinal	35
1. Procain	28
2. Combined	7
b. Ether	3
c. Ethylene	3
d. Cyclopropane	3

Types of Hernia:

1. Inguinal	15
a. Direct	9
b. Huge indirect	6
2. Incisional	15
a. Previous mid-right rectus incision	8
1. Upper abdomen	3
2. Lower abdomen	5
b. Previous mid-line incision	7
1. Upper abdomen	2
2. Lower abdomen	5
3. Umbilical	6
4. Femoral	5
a. Women	4
5. Diaphragmatic	2
a. Side of diaphragm: Left side	2
6. Epigastric	1

1930 Wilshire Boulevard.

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DISCUSSION

HALL G. HOLDER, M.D. (1107 Medico-Dental Building, San Diego).—Doctor Collins' presentation is timely, as little improvement in end-results has occurred in herniorrhaphy since Bassini introduced his method of radical repair in 1899. In the repair of inguinal hernias three general principles are universally agreed upon following the advent of the radical operation, namely, (1) complete dissection of the inguinal canal, with particular attention to the removal of all areolar tissue, so that firm union may be had between either muscle and fascia, or between fascia and fascia; (2) high ligation of the sac, preferably with transplantation high under the internal oblique muscle; and (3) plastic reconstruction of the inguinal canal.

The different types of reconstruction can be classified simply into three main groups: (1) Bassini's original description of the transplantation of the cord; (2) Non-transplantation of the cord, as advocated by Ferguson; and (3) Extra-apponeurotic transplantation of the cord, as typified by Halstead, Andrews, and others. The tremendous advantage of the use of fascia lata over ordinary suture materials in the repair of hernias, particularly difficult types of hernias as related by Doctor Collins, is further emphasized by reviewing the recent literature on the subject. Using only the best sources, I find reported 3,275 cases of indirect inguinal hernia repaired without fascia, giving an average recurrence rate of 5.5 per cent as against 188 reported cases in this same condition in which fascia was used with a recurrence rate of only 2.6 per cent. Still more striking, the average recurrence rate using foreign suture material in 804 direct hernias reported in the literature was 16 per cent, as against a recurrence of only 3.5 in 252 cases repaired with fascia. No definite information could be obtained regarding the recurrence rate of recurrent hernia, but it is only fair to believe that this would be much higher than the 16 per cent for the direct hernia. I find only forty-five cases of recurrent hernia repaired with fascia with a recurrence rate of 6.6 per cent reported, which undoubtedly is far below that of the ordinary suture material.

Until the year 1935 my records show that I performed forty-five Galli fascial repairs with a recurrence rate of 2.2 per cent, and twenty-seven McArthur herniorrhaphies with a recurrence rate of 3.7 per cent. At the same time I reviewed 103 cases of indirect inguinal hernia which had been repaired with the ordinary suture materials in which I had a recurrence rate of 6.7 per cent. Therefore, in my own hands, using identical technique with the only variable suture material, I obtained one-third less recurrences in the more difficult cases using fascia over other suture materials.

Points in technique which I think are important, and which I repeat for emphasis, as Doctor Collins has mentioned most of them, are: extra-aponeurotic transplantation of the cord, high ligation of the sac with transplantation, closure of the transversalis fascia, careful cleaning away of all of areolar tissue from fascial and muscle structures, so as to allow a two or more layer repair of the inguinal canal beneath the cord with the fascial sutures.

As Doctor Collins has indicated, I believe that the fascial stripper simplifies the obtaining of the fascial sutures which can usually be done by an assistant with no loss of operating time. In the placement of the sutures, I prefer to employ a fascial suture clamp which I devised, instead of the Galli needle, as it permits of more rapid suturing with much less traumatization of tissue. This latter is a very important point, I believe, in obtaining the best results in this type of repair, as most failures come from excessive traumatization from the large Galli needle with sewn-in fascial suture.

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C. LATIMER CALLANDER, M.D. (450 Sutter Street, San Francisco).—Doctor Collins has given us, in a clear-cut and painstaking manner, the case for the use of autoplastic fascia lata in the repair of all varieties of rupture. So many able surgeons now employ fascia lata transplants in hernial repair as a matter of routine that I am convinced of the general utility of this suture material. Antagonists of the method cannot overlook the manifest fact that a fascia lata suture holds opposed surfaces over a broader area than does any other material, and, in addition, unites with the opposed tissues. No other material can be woven into a living overlay over a gross tissue defect. Masson's stripper has made collection of the sutures a simple step in the operation.

It was well to call attention to the pioneer work of McArthur in this field. His method of using attached strips of the external oblique aponeurosis from the edges of the inguinal hernia incision can be utilized in all indirect inguinal hernias and in most direct ones. This method, however, only allows sufficient suture material to unite the incision in the external oblique aponeurosis, and to approximate the conjoined muscle and tendon to the shelving edge of the inguinal ligament. Gallie and Le Mesurier have carried their investigative work and clinical applications in autoplastic suture material far further than did McArthur, and soundly established their method of tissue approximation.

With the contention, however, that aponeurosis will not unite firmly to muscle when held in place by either catgut or silk ligature, I am heartily out of accord. Anyone who has had occasion to repair many recurrent ruptures cannot fail to recall instance after instance in which sharp-knife dissection was required to separate the lower margin of the internal oblique and transversus abdominis muscles from the inguinal ligament. The failure of the hernia operation often is not a faulty new wall, formed in front of or behind the cord, but is a result of not ligating the hernial sac sufficiently high.

E. Eric Larson, M.D. (1930 Wilshire Boulevard, Los Angeles).—Until recent years much confusion as to the best procedure for repair of large ventral, recurrent direct and inguinal hernias, has existed. Tabulated statistics of data have shown that recurrences existed in surprising proportions. Past military activity and the advent of rigid physical examinations of all employees, especially in the heavy industries, have placed a burden on the successful surgical attack of hernias.

For these reasons, and for the added fact that there must be progress in surgical technique, the essayist has today brought to our attention the use of autogenous fascia for more successful repair.

Doctor Masson's method of obtaining strips of fascia lata is a distinct contribution. Experimental studies have revealed that transplanted fascia becomes incorporated as living tissue in about one year. Therefore, the strength and permanence of this tissue, which neither stretches nor contracts, adds to the permanence of closure and successful treatment of these defects.

This is especially true in large ventral hernias where much tissue may be lacking. A basket-weave type of fascia stripping, much like darning a hole in a sock, has been a most salutary and welcomed procedure. Where there is enough tissue, strips of adjacent fascia are woven into the suture lines. The result of this added suture has given excellent and permanent support to the sutured edges. Harrington's use of fascia in the repair of large diaphragmatic hernias has added an amazing permanence to this type of repair, since very few recurrences are reported when fascia is used.

I have used fascia strips for fourteen years, and in the obese patient or those over forty years of age with inguinal hernia I incorporate strips of the aponeurosis of the external oblique into the sutures, as first described by L. L. McArthur in 1901.

The intelligent use of fascia is becoming world-wide, and will no doubt afford us better statistics in a short time.

TONSILLECTOMY: A PLANNED, COMPLETE OPERATION*

By William Remfry Hunt, M.D.
Santa Barbara

Discussion *by Frank S. Baxter, M. D., Oakland; W. H. Johnston, M. D., Santa Barbara.*

THE purpose of this paper is to discuss, and demonstrate with slides of removed tonsils, a planned complete removal of the palatine tonsil and its lymphoid appendages, with particular emphasis on the latter. It may seem strange to take time to discuss the most commonly operated tissue, the tonsil; however, the surgical technique of this important structure cannot be overemphasized. As we all know, the two main methods are: (1) with the various types of tonsillotomes or guillotine instruments, (2) with the variable dissection and snare method.

ANATOMY

The palatine tonsils lie in the oropharynx. The arterial supply to the tonsils from branches of the external carotid are the ascending palatine and anterior tonsillar of the external maxillary (facial), ascending pharyngeal, the dorsum linguae branches of the lingual, and the descending palatine branch of the internal maxillary. The venous drainage through the tonsillar and pharyngeal plexes enters the facial veins. The nerve supply comes through the lingual branch of the fifth, and from the ninth, tenth, and sympathetics. Over the upper pole, the capsule is separated from deeper structures by loose areolar tissue (the most common site of peritonsillar abscess). Below this the capsule is intimately blended with the muscles, namely, the palatopharyngeus or posterior pillar, the palatoglossus or anterior pillar, and laterally partly by the superior constrictors of the pharynx. The plica semilunaris is a fold of mucous membrane joining that of the pillars medial to the upper pole of the tonsil. The plica triangularis is a fold of mucous membrane which extends medially and downward from the margin of the anterior pillar, surrounding the lower pole like a sling. This appendage contains masses of lymphoid tissue. It extends to the pharyngeal border of the tongue. Here the lymphoid masses may be termed lateral lingual tonsil. Below the lower pole of the tonsil proper is a subtonsillar lymphoid chain of varying amounts of lymphoid tissue, lying against the muscles and covered by mucous membrane. This subtonsillar lymphoid tissue may extend downward as far as the pharyngo-epiglottic fold.

It is my opinion that all this lymphoid tissue should be removed in every tonsillectomy. Some laryngologists have advocated removing the tonsil and not disturbing these lymphoid appendages routinely; but doing so at a second operation if subsequent examinations indicate that they are a septic focus of infection. However, few, if any, patients would return to the original surgeon for a second operation. As there is no objection to their removal, and they are frequently definitely septic, and they are a common site of recurrent acute inflammation, it seems well worth while to give the patient the maximum benefit of an initial complete tonsillectomy.

While it does not come directly within the subject of this paper, I may mention the lymphoid tissue, especially the lateral lymphoid bands on the pharyngeal wall. This tissue is present in a large percentage of people in every age group, especially preadolescents. It is more abundant in the so-called lymphoid types. Why some people have more lymphoid tissue on the pharynx than others is not known. The writer has observed it more often in the allergics and hypothyroids. That its presence is due to posterior sinus infection, alone, is contrary to my experience. That, if present, it becomes readily inflamed with any inflammation of the upper respiratory tract is an almost daily clinical observation. If someone has not already done so, may I suggest the term "lymphoid pharyngitis," as preferable to "granular pharyngitis" for this condition. As a rule, I remove these pharyngeal lymphoid masses, if of consequential size, when doing a tonsillectomy. If present, they are the most common site of sore throats, when an otherwise successful tonsillectomy has been accomplished.

TECHNIQUE

The writer has attempted to rationalize his surgical technique to strict anatomical detail.

In tonsil surgery, good lighting, making for good vision, is vital. Direct reflection from a head mirror over the eye is best. The Klaar lamp or similar

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